6 Pence No 4.

SYLLABUS

OF A

COURSE OF LECTURES

UPON THE

ANIMAL ŒCONOMY.

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ADVERTISEMENT.

THE following Syllabus of a Courſe of Lectures, which has been repeated for the 5th time in London, is deſigned chiefly for the uſe of thoſe who attend; but I have been induced alſo to make it public, for this reaſon, that any perſon wiſhing to become a Pupil, may previouſly comprehend the extent of the Courſe, and the Subjects which are included in it.

I wiſh likewiſe to ſubmit it to the conſideration of thoſe who are entruſted with the regulation of the purſuits of young men about to engage in the ſtudy of Medicine, that they may be enabled to judge how far ſuch a Courſe is worthy of attention, among the Lectures on the various other branches of Phyſic, which are uſually recommended to them.

The intention of this Courſe is to deliver an account of ſuch laws and phænomena of the Animal Œconomy, as cannot well be included to the neceſſary extent in the Lectures upon Anatomy, and to connect theſe, and point out their application to morbid phænomena in particular inſtances, ſo as to lead to an accurate knowledge of diſeaſe, and eſtabliſh a proper foundation for future ſtudy and obſervation. As no anatomical deſcriptions are given in this Courſe, and as a *knowledge of Anatomy is required, in order to comprehend many of the ſubjects treated of, I have hitherto confined theſe Lectures to the Spring and Summer Seaſons, and mean in future to purſue the ſame plan; by which the Student has an opportunity not only of making ſome previous progreſs in Anatomy, but may avail himſelf of a ſtate of leiſure (when compared with the numerous active purſuits, which occupy his attention during the Winter), for acquiring this uſeful branch of knowledge.*

Many of the ſubjects of this Courſe are ſimilar to thoſe included in the Lectures on the Theory of Medicine, which are conſidered at moſt Univerſities, where Phyſic is taught, as an uſeful auxiliary to Lectures on the Practice of Phyſic, if not an eſſential part of medical education. In London, where the advantages derived from an attendance upon the Hoſpitals, and the Lectures on the different branches of Medicine, are ſo conſiderable, and where there is conſtantly ſo great a concourſe of Students, it appeared to me that ſuch Lectures only were wanting in order to render the plan of Study complete. For more than two years paſt, I have therefore endeavoured to ſupply this defect, conſcious that any failure in the attempt was more to be imputed to myſelf than to the ſubject, which, in proper hands, is replete with the moſt ſtriking advantages; as clear and *rational views of the Animal Œconomy keep up a ſpirit of uſeful inveſtigation, and lay the only ſolid foundation for accurate obſervation, and for ſucceſsful practice in difficult and obſcure caſes.*

The ſucceſs which I have hitherto experienced in the proſecution of this plan, and the encouragement I have received from ſeveral Gentlemen of high profeſſional character, engaged in the line of public teaching, have induced me to cultivate phyſiological knowledge, with much attention, ſo as to enable me, from time to time, to improve the Lectures, and I hope at laſt to render them a tolerably complete outline of the ſubject. As a ſatisfactory knowledge of the Animal Œconomy can be acquired only by a careful examination of the morbid appearances upon diſſection, compared with the ſymptoms during life, and with the healthy condition of the body (morbid phænomena often throwing great light upon the healthy functions), I have ſpared no pains in obtaining the inſpection of ſuch bodies as were likely to contribute to this end. The prejudices againſt Diſſection are daily giving way, and the time ſeems to be approaching, when we ſhall enjoy all the advantages of a very improved Phyſiology, and more certain and ſucceſsful Pathology. The poor and illiterate not unfrequently in their laſt moments deſire this kind of examination after death, either as an act of *duty to thoſe that ſurvive, or of gratitude to thoſe medical attendants, who by diligence and humanity, during a long illneſs, have gained their affections, and to whom they often know that this indulgence will be acceptable. I have already ſuggeſted a plan to many of my medical friends and others, and flatter myſelf that with their aſſiſtance, I ſhall ſoon be able to carry it into execution, by which I expect to contribute conſiderably towards the removal of thoſe obſtacles, which we have ſometimes to encounter in conducting theſe purſuits.*

In this way then, and by inſtituting occaſionally upon animals ſuch experiments as are likely to be productive of real utility, avoiding in every inſtance a pernicious reliance upon hypotheſis and conjecture, I propoſe to perſevere in thoſe endeavours, which, in the intention at leaſt, muſt, I think, meet with the approbation of the candid and ſenſible part of mankind.

If my Lectures ſhould only excite ſuch a degree of curioſity and love of knowledge in my hearers, as to lead them to a proper choice of books; to reflection, patience, diſcrimination, and labour; in ſhort, to a well conducted plan of ſtudy, and an enlarged view of the Animal Œconomy, my end will be fully anſwered.

Charter-Houſe Square*,*
May 1, 1788.

ON LIFE.

UTILITY of a definition or deſcription of Life, previous to the conſideration of other phyſiological ſubjects.

Neceſſity of taking an enlarged view of the principle of Life, not only as connected with the action of the heart of animals, but as reſiding in the numerous vegetables diſperſed over the globe, &c.

In this enquiry, the circumſtances which diſtinguiſh living animals and vegetables from inanimate matter ſhould, if poſſible, in the firſt place be aſcertained.

2dly. The things which are in common to animals and vegetables.

3dly. The marks of diſtinction between animals and vegetables; and,

Laſtly, Man ſhould be diſtinguiſhed from other animals.

Difficulties attending the attempt to divide all the works of nature into the three great claſſes of animal, vegetable, and mineral kingdoms.

Marks of diſtinction, on the whole, however, more ſatisfactory between animals and vegetables, on the one hand, and minerals on the other; than between animals and vegetables.

Animals

Animals and vegetables poſſeſs manifeſt ſigns of organization, or ſuch an arrangement of parts, as fits them for growth, for the performance of various active functions, and for multiplying their ſpecies. Their increaſe from within outwards, and they are ſubject to various internal operations and changes, not immediately connected with the agency of external cauſes.

Minerals, on the contrary, exhibit no proofs of an internal power. They increaſe only by accretion, or an acceſſion of ſimilar parts from without, and they appear to be ſubject to no changes, excepting thoſe which ariſe from mechanical attrition, or the operation of chemical bodies, effecting decompoſition. This the general opinion, but there are ſome who have expreſſed doubts on the ſubject, and, among others, Dr. Watſon, Biſhop of Landaff.

View of the arguments in favour of each opinion.

1ſt. Of that ariſing from the power poſſeſſed by animals and vegetables of uniting divided parts. Do minerals appear to poſſeſs ſuch a power?—And,

2dly, Of that connected with the faculty in animals and vegetables of regulating temperature, or generating heat or cold, according to particular exigencies.

Proofs of this power from Dr. Blagden's account of ſome experiments made by Dr. Fordyce and others in heated rooms, publiſhed in the Philoſophical Tranſactions for 1775.

Proofs from a ſecond paper by Dr. Blagden, in the ſame volume.

The mercury in Farenh. thermometer roſe above 260 deg. in the heated room, and yet the body was capable of bearing it without any conſiderable inconvenience.

Evaporation concluded to be inſufficient alone to produce the effects, and a power, therefore, of generating cold aſcribed to the body.

Proofs from the Experiments of Dr. Dobſon, in the ſame volume of the Tranſactions.

Examination of the various objections to theſe experiments.

Proofs of the oppoſite power, that, viz. of reſiſting cold, or generating heat, from Mr. John Hunter's paper, in the ſame volume of the Philoſophical Tranſactions.

His ideas on this ſubject.

Do minerals appear to be endowed with a ſimilar power?

Among other phænomena of life, poſſeſſed both by animals and vegetables, may be enumerated the faculty of reſiſting fermentation and putrefaction.

In tracing the analogy between animals and vegetables, a proceſs of circulation and ſecretion common to both.

Perſpiration or exhalation, and abſorption likewiſe, with ſomething analagous to reſpiration, all to be met with among vegetables as well as animals.

In the proceſs of generation alſo a ſtrong analogy.

Something ſimilar to a muſcular power has been attributed to plants, in conſequence of the exertions which ſome of them make on the application of ſtimuli, and the apparently ſpontaneous motions of others.

Attempt to diſtinguiſh animals from vegetables.

Inquiry how far volition, or a power of ſpontaneouſly performing motion, will aſſiſt in the diſtinction.

Inquiry how far a ſtomach is to be conſidered as the characteriſtic mark of animals.

Additional obſervations on the living principle, eſpecially as exhibited in a freſh laid egg.

Review of the various phænomena moſt eſſential to life, and an inquiry how far a ſelection of one or more of theſe may ſerve as a ſatisfactory definition on the ſubject.

How far is it dependent on the brain or heart in animals?

View of the arguments in favour of organization as neceſſary to life.

Beſides the vital principle, which appears to be poſſeſſed in a more ſtriking degree by ſome animals even than man, frogs and many others being far more tenacious of life, the phyſiology of the human body much influenced by the more perfect ſtate of the mind or *immaterial thinking principle*, with the variety of its modifications or faculties.

It is this more perfect ſtate of the mind which muſt ſerve to diſtinguiſh man from other animals, more than any difference in the ſtructure or organization of the body.

The operations of the mind diſtinct, therefore, from the vital principle, but are, notwithſtanding, ſo far connected with it, that they ſometimes remarkably influence each other.

How far can the greater variety of diſeaſes with which man is affected, be underſtood from a conſideration of thoſe violent emotions of which he is ſuſceptible, and which do not appear to operate on other animals?

Examination of the arguments in favour of a vis medicatrix naturæ.

The operation of the vital principle appears to be ſufficient to explain all the phænomena which have been aſcribed to any ſuch additional ſuppoſed power.

On the SIMPLE SOLID, &c.

VIEW of the doctrine of the ſimple ſolid, ſimple fibre, &c.

Chemical compoſition of the ſolids—Earth, oil, ſalt, water, phlogiſton, and fixed air.

Variety in the proportions of theſe parts, the ſuppoſed cauſe of diſeaſe, but when to any extent rather to be conſidered as the conſequence of a previous diſeaſed alteration in the living fibre.

The analyſis incomplete likewiſe, and affords no ſatisfactory information in the treatment of diſeaſe.

Every part of the body to be conſidered alive, though, perhaps, in different degrees; and every change, even in the moſt ſolid bone, to be attributed to an alteration in the condition of the vital principle.

The remedies, therefore, muſt all have a reference to the parts, as connected with life; and the flaccidity or looſeneſs, firmneſs, or rigidity of the body, with the various diſeaſes of the ſimple ſolid, as treated by Gaubius, muſt all be conſidered in the ſame view.

All that can be ſaid, with regard to the ſolids and fluids, in an inquiry of this kind, is, that a certain arrangement or proportion of theſe is neceſſary to life; neither ſolids nor fluids alone being capable of the phænomena which are characteriſtic of the vital principle.

Muſt be confeſſed, at the ſame time, that in different perſons there is a conſiderable difference in the proportion of the ſolid and fluid parts, even compatible with health.

DIGESTION.

Maſtication.

Neceſſity of giving ſome account of the ſaliva and gaſtric juice, previous to the examination of the various ſecreted fluids.

General obſervations—Hunger, thirſt, &c. in what view to be conſidered.

Food of different animals.

Diſpute between Buffon and Sparman, with regard to the effects of animal and vegetable food on man.

Concluſion from the numerous facts, which have been advanced by authors on this ſubject.

Condiments—their nature—employed by the inhabitants of the moſt uncivilized countries—common ſalt—foſſil alkal.—various aromatics, and acrid ſtimulating ſubſtances.

Variety of drink conſidered.

The food being well chewed, and mixed with the ſaliva; and being propelled into the ſtomach, what are the changes to which it is there ſubjected?

View of the four principal hypotheſes, which have been advanced at different times, to explain the proceſs of digeſtion.

Heat.

Putrefaction.

Trituration.

Fermentation.

All theſe proved erroneous, and the lateſt and moſt generally adopted explanation, is, that it depends on chemical ſolution; that the gaſtric juice has a power of decompoſing the aliment, ſo as to diſſolve and unite with the nutritious parts of which it is compoſed, afterwards to be converted into chyle; the more inſoluble parts being rejected with the fæces.

The proofs of this doctrine numerous.

Account of Reamure's Experiments, made in 1752.

Obſervations on the ſolution of the ſtomach, by means of the gaſtric fluid, publiſhed by Mr. John Hunter, in the Philoſ. Tranſact. for 1772.

Experiments made by Dr. Stevens, at Edinburgh, in 1777.

View of the numerous experiments of Spallanzani, in proof of the ſame doctrine.

Opinions of Mr. Hunter, lately publiſhed in his Treatiſe on the Animal Œconomy.

To what extent is the preſence of acidity in the healthy ſtomach to be admitted?

Experiments in proof of its conſtant preſence, by Dr. Ruſh, of Philadelphia, publiſhed at Edinburgh. — Admitted to a greater extent by Mr. Hunter than by Spallanzani, tho' not believed even by him to be invariably preſent, or eſſential to digeſtion.

Coagulation of milk in the ſtomach no proof of acidity.

Acidity not eſſentially neceſſary to the activity of metallic calces in the ſtomach.

Coagulation of milk by the ſtomach, and by other animal ſubſtances, in what view to be conſidered.

Coagulation or ſolidity ſuppoſed by ſome to be a principle neceſſary to the formation of chyle.

Objections to this opinion.

Liquid aliment of different kinds, ſugar, and the ſaccharine juices of vegetables, &c. tho' in their nature not liable to this kind of coagulation, are, notwithſtanding, extremely nutritious, and, in many caſes of weakneſs, the more liquid the aliment and the leſs diſpoſed to coagulation the better.

Analyſis of the gaſtric juice.

Neither acid nor alkaline, but ſtrongly antiſeptic.

Stomach an organ of the greateſt importance, not a mere bag or receptacle for the food, as once thought, but in its healthy ſtate furniſhes a ſecretion, poſſeſſing very active properties, and producing effects different from any other fluid in nature. Still neceſſary, however, to enquire whether the ſolution of the food by the gaſtric juice be ſufficient to account for the production of chyle, or whether it is only a previous proceſs.

Does the bile aſſiſt in the formation of chyle?

Experiments on animals, to determine this point.

Obſervations on the termination of the duct. com. choled. and pancreatic duct, in the duodenum, and on the uſe of the pancreatic juice.

At what part of the inteſtinal canal does the inſoluble part of the food take on the nature of the fæces?

Application of the doctrine of ſolution in digeſtion to various phænomena, both in the healthy and diſeaſed ſtate of the body.

Operation of condiments explained.

Neceſſity of a certain proportion of fluid to facilitate ſolution, on chemical principles.

Pernicious effects of wine and ſpirituous liquors in exceſs, deſtroying the natural action of the ſtomach, and impeding, or altering, the ſecretion of the gaſtric fluid.

Exceſs of condiments hurtful on the ſame principle.

Utility of chewing the food thoroughly, eſpecially when the ſtomach is weak, ſatisfactorily underſtood on the principles of ſolution.

Food in ſmall quantities, and frequently repeated, beſt adapted to weak ſtomachs, becauſe the ſolvent or gaſtric juice is deprived of its uſual activity.

Exhibition of gaſtric fluid, collected from animals, as a remedy in ſuch caſes, conſidered.

Effects of exerciſe on the proceſs of digeſtion.

Obſervations on ſome of the cauſes which impede digeſtion.

Alteration of ſtructure in the ſtomach.

Alteration of action and ſecretion.

Food examined.

1ſt. In relation to its quantity.

2d. ———— to its quality.

Plan of a table, calculated to exhibit the comparative ſolubility, &c. of the various articles of food.

Sympathy or connexion between the ſtomach and various parts of the body, conſidered.

Remarkable phænomena, ariſing from this kind of connexion with the brain, ſurface of the body, heart, uterus, urethra, and teſtes.

Moſt remedies act upon the ſtomach, and have their effects extended throughout the ſyſtem, independent of abſorption.

The ſtomach ſuppoſed by ſome to be the ſource of animal heat—Rigby, &c.

Experiments lately made to determine the condition of the ſtomach, &c. in the act of vomiting.

Various phænomena, connected with the contraction of the ſtomach.

PROPERTIES

PROPERTIES of the CHYLE.

Difficulty of collecting it, &c.

In man and quadrupedes, whitiſh, milky, homogeneous appearance.

In birds, tranſparent—ſweet taſte—coagulable—aceſcent tendency.

Chemical analyſis—water—oily ſubſtance—cheeſy or glutinous matter—earth.

Preſence of ſugar inferred from its ſweet taſte.

May be rendered blue, yellow, red, &c. by mixing different colouring ſubſtances with the food.

Qualities of the chyle altered by various ingeſta, independent of a change of colour.

Lacteal veſſels—courſe of the chyle, &c.

PROPERTIES of the BLOOD.

Importance of the enquiry.

Various points of view in which the blood may be conſidered.

Conſiderable improvements by Mr. Hewſon and others, but many things ſtill doubtful.

Compoſed of various parts.

Halitus or exhalation immediately after its eſcape from the veſſels, and its properties.

Concretion of the blood, and ſeparation into *ſerum* and *craſſamentum*.

Proportion which theſe bear to one another, calculated by Bryan Robinſon, and Senac.

Great variety independent of diſeaſe, and the calculation extremely difficult.

Craſſamentum divided into coagulable lymph and red particles.

Properties of the *coagulable lymph*.

Various methods of obtaining it.

Whitiſh, and without ſmell or taſte—Coagulation happens between 114 and 120½ of Farenheit's thermometer.

Action of acids on the coagulable lymph.

Action of alkaline ſalts.

Effects of neutral ſalts and alcohol.

Nutrition effected by the coag. lymph.

Its properties altered in diſeaſe.

Is now generally believed to form the white covering upon inflamed blood.

Various remarkable phænomena within the body, ariſing from the ſeparation of the coag. lymph from the other parts of the blood.

Polypi within the heart and large veſſels.

Contents of aneuriſms.

Thrown out from the veſſels in conſequence of inflammation. 1ſt. Cauſing adheſion. 2d. Appearing in form of a ſmooth white membrane. 3d. In ſmall irregular pieces, diffuſed through pus, ſerum, &c.

Cavity of the abdomen, pericardium, &c. after inflammation.

Blood effuſed, and the red particles wholly or partly abſorbed, leaving the coagulable lymph—

Moles or falſe conceptions—Subſtance aſſiſting in plugging up the orifices of divided or ruptured arteries.

Subſtance ſituated between the extremities of a fractured bone.

Bronchial polypus, from Tulpius, &c.

Examination of the *red particles*.

Various hypotheſes from the microſcopical obſervations of Lewenhoeck, &c.

Obſervations made by Mr. Hewſon on this ſubject.—His hypotheſis to explain their formation—refuted by Dr. Monro and others.

Their formation in no degree underſtood, but many of their properties well aſcertained.

Method of obtaining the red particles free from the other parts of the blood.

Chemical properties of the powder.

Uſe not known—When abundant—When deficient—Formed by a ſlow proceſs, and rather the conſequence than the cauſe of a vigorous ſtate of the body.

Properties of the *Serum*.

Generally tranſparent—ſaltiſh—ſlight yellow, or ſtraw colour.

Specific gravity.

Contains a coagulable part, rendered evident by 160 degrees of heat of Farenheit's thermometer.

Attempt to determine whether this coagulable part be ſimilar to the coagulable lymph.

Objections to Mr. Hewſon's opinion on the ſubject.

Saline matter of ſeveral kinds in the ſerum.—Experiments of different perſons to determine the quantity, &c.

Serum ſometimes milky and opake—Suppoſed by Mr. Hewſon to depend upon the abſorption of fat, or animal oil.

Obſervations of Malpighi and Morgagni, to prove the preſence of oil occaſionally in the blood, but the appearance very different from that deſcribed by Mr. Hewſon.

Milky opake appearance ſeen by him, rather to be aſcribed to unaſſimilated chyle.

Inquiry whether the blood contains air in a looſe and ſeparable ſtate—Experiments by the late Dr. Monro with portions of arteries and veins, including the blood, by means of ligatures, in the air-pump, proved erroneous by Dr. Darwin, in the Philoſoph. Tranſact. for 1774.

Obſervations upon the blood, conſidered as an aggregate, or having all its parts intire.

Effects of diſtillation—No information to be derived from this ſource.

Examination of the ſpecific gravity, heat, and colour of the blood.

Arterial and venous blood.

Change of colour takes place in the lungs.

Addition of different ſaline bodies to the blood.—Method in which inquiries of this kind ſhould be conducted, in order to obtain uſeful information.

Are there any remedies that act upon the fluids?

Coagulation of the blood, independent of any addition.

Effects of cold, reſt, and air upon the blood, examined.

Cauſe of coagulation not underſtood.

Mr. Hewſon's experiments, to prove the power of the air upon blood, in altering its colour.

Under ſurface of craſſamentum expoſed to the air with different effects.—Sometimes ſpeedily becomes florid—at other times continues dark and blackiſh, after conſiderable expoſure.

Time required for coagulation extremely different in different conſtitutions and diſeaſes.

The longer the time required for coagulation, the greater the chance of the ſizey appearance of blood.

Mr. Hewſon's explanation of ſizey or inflamed blood.

Diminiſhed tendency to coagulation, &c.

Various circumſtances, not mentioned by Mr. Hewſon, neceſſary to be conſidered.

Mr. Hey's theory on this ſubject.

Facts of conſiderable utility eſtabliſhed by him, but his theory deficient in particular points.

Sizey blood, in what view to be conſidered.

Increaſed tendency to coagulation in the blood, ſuppoſed by Mr. Hewſon to depend upon weakneſs.

Experiments made by Mr. Hey, to determine this point, with a very different reſult from thoſe of Mr. Hewſon.

Various exceptions at any rate neceſſary to be made to Mr. Hewſon's theory.

Examination of the intire loſs of coagulation in the blood.—Animals hunted to death, &c. Difficulties attending the inveſtigation of the want of coagulation in blood.

Doctrine of the *Life of the Blood*, examined.

Putrefaction of the blood.

Extremely doubtful whether it ever happens in the circulating fluids.

Experiments on this ſubject, by Dr. Lind, and others.

Various caſes, in which putrefaction has occurred very ſpeedily after death.

Principle on which it depends not underſtood, but no proof even of a tendency to this change during life.

Doctrine of *acrimony of the fluids* in various diſeaſes, founded upon erroneous ideas of the animal œconomy.

Acid, alkaline, empyreumatic, and other acrimonies, ſo ingeniouſly arranged by De Haen, in his table on this ſubject, never to be perceived in the circulating maſs, but confined to the primæ viæ.

Only view in which a humoral pathology admiſſible, as it relates to a greater or ſmaller quantity of blood than is compatible with health, conſtituting the two oppoſite ſtates of *Plethora* and *Inanition*.

Examination of the proportional quantity of blood in the body.

Various methods attempted, in order to aſcertain this point.

Calculations on the ſubject extremely different.

Concluſion from the various facts and experiments.

Transfuſion conſidered—with ſome recent experiments relating to it.

Effects ariſing from various ſubſtances injected into the blood veſſels.—Fontana's experiments on poiſons, &c.

On the CIRCULATION of the BLOOD.

Conſtant motion of the blood.

Velocity different in different parts, but various proofs that the motion is on the whole very rapid.

Cauſe of the motion or circulation of the blood.

Muſcular power of the heart and veſſels.

Stimulant power of the blood, exciting action and contraction.

Upon what principle does the ſtimulant property of the blood depend?

Various proofs of the blood's ſtimulating the heart and veſſels to contraction.

Irritability, in what ſenſe to be employed.

Heart, arteries, and veins, poſſeſs very different degrees of this property—greateſt in the heart.

Proofs of the muſcular power of arteries.

Proofs of the irritability, or muſcular power of veins.

Courſe of the blood, as deſcribed by Harvey, with an examination of the moſt ſtriking proofs in its favour, and of the methods by which he was led to this important diſcovery.

Various phænomena connected with the circulation of the blood.

Fœtal circulation.

Various calculations of the force with which the heart acts.

Does not admit of an accurate calculation, but muſt be very great, there being numerous cauſes which conſtantly operate in retarding the velocity of the blood in its paſſage through the arteries and veins.

Experiments by Dr. Hales, to determine the difference of velocity in arteries and veins.—On this principle, wounds, *cæteris paribus*, more dangerous in arteries than in veins, and in arteries the nearer the ſource of circulation.

Examination of the different cauſes which retard the velocity of the blood.

Examination of ſome of the cauſes which occaſionally operate in producing an increaſed velocity of circulation in the whole body, or in particular parts, to be judged of in general by the pulſe.

Pulſation, on what condition of the artery ſuppoſed by different perſons, to depend—Why, for the moſt part, wanting in veins.

Effects ariſing from the irritability of the heart and arteries, and ſtimulant action of the proper quantity of blood in the healthy adult.

Effects ariſing from an increaſed proportion of blood, very different, according to circumſtances, and only to be underſtood by an attention to the phænomena exhibited by ſeveral organs of the body, poſſeſſing a muſcular ſtructure.

Irritability of the heart and arteries extremely different at different periods of life, giving riſe to all the remarkable varieties in the *frequency* of pulſation from the period of infancy to that of old age.

Varieties in the ſtate of pulſation, either *ſimple* or *compounded*.

The *ſimple* varieties in the pulſe are ſuch as relate to its being

1. Quicker or more frequent than the ſtandard.
2. Slower.
3. Stronger.
4. Weaker.
5. Harder.
6. Softer.
7. Fuller.
8. Smaller.
9. Oppreſſed.
10. Irregular.

The *compound* varieties are thoſe which have a reference principally to its being

1ſt. Stronger and more frequent,
2d. Weaker and more frequent,
3d. Weaker and ſlower, than the ſtandard.

Utility ariſing from a knowledge of the courſe of the blood, and of the laws of circulation.

Conſideration of various phænomena depending upon the unequal diſtribution of the blood.

On RESPIRATION.

Its intimate connexion with circulation, &c.

Inſpiration—Expiration.

Dilatation of the cheſt—in what manner effected.

External and internal intercoſtal muſcles proved by experiments to perform a ſimilar function.

Action of the diaphragm conſidered;

Numerous experiments of Haller and others, on this ſubject; proved to be active only during inſpiration.

Muſcles, &c. concerned in expiration.

Inquiry concerning the uſes of reſpiration.

Various hypotheſes and contradictory opinions for a long time on this ſubject.

Accurately inveſtigated, firſt by Mr. Cigna, of Turin.

Obſervations of Mr. Hewſon, on the change produced upon the blood in the lungs, by the air received in the act of inſpiration.

Dr. Prieſtley's remarks on reſpiration, in the Phiſophical Tranſactions for 1776.—Various Experiments to prove that it is a phlogiſtic proceſs, the air being contaminated by breathing in the ſame manner as by the calcination of metals, &c.

The air ſuppoſed by him to exert its influence, through the coats of the veſſels, upon the blood, in a ſimilar manner as happens through the ſides of a bladder containing blood out of the body.

Difficulties attending this opinion.

More conſiſtent with the phænomena of the living body, that whatever change is produced upon the blood in the lungs, is in conſequence of a ſecretion or ſeparation from the extremities of the exhalent arteries, opening every where on the ſurface of the bronchia.

In this way probable that, independent of the *watery exhalation*, *phlogiſton*, *fixed air*, and a principle anſwering to the ideas of *contagion*, are expelled from the blood in the lungs; the air being the fitteſt menſtruum for uniting with theſe, and diſcharging them from the body.

View of Lavoiſier's doctrine on the ſubject, and likewiſe of that of Dr. Goodwin, lately publiſhed at Edinburgh.

Further experiments and obſervations wanting upon this ſubject; but whatever diſputes concerning phlogiſton, or the exact manner in which the air produces its effects, cannot be doubted that a very principal uſe of reſpiration is that of producing a conſiderable change in the blood, ſo as to fit it for the purpoſes of reſpiration.

Another uſe aſcribed to the lungs.—Source of animal heat.

View of Dr. Crawford's theory.

Obſervations and experiments publiſhed by him in the Philoſ. Tranſact. for 1781, in defence of his opinions.

Difficulties attending every doctrine of animal heat, derived from reſpiration, pointed out.

Inquiry to what extent the converſion of chyle into blood is effected in the lungs.

Examination of the opinions, with regard to the manner in which the firſt inſpiration is effected.

Objections to the explanation propoſed by Dr. Whytt.

The ſubject very obſcure, and difficult of inveſtigation.

Experiments of Buffon on young puppies, with a view to reſpiration.

Opinion that reſpiration is leſs neceſſary to young than to old animals, examined.

Cauſes ſuſpending or preventing reſpiration immediately after birth.

Operation of the air in promoting the free paſſage of the blood through the lungs, conſidered.—Experiments of Kau Boerhaave, &c.

Secondary uſes of reſpiration.

Voice and ſpeech—Smelling—Expulſion of the urine and fæces, of the fœtus and ſecundines—beſides which, ſighing, yawning, laughing, crying, hiccoughing, ſneezing, and coughing, all affections of this function.

Obſervations upon each.

PATHOLOGY of RESPIRATION.

Vide Table.

On SECRETION.

Introductory obſervations.

Various terminations of arteries.

Glands divided into ſimple and compound, &c.

Doctrine of Malpighi on the ſtructure of glands.

Doctrine of Ruyſch.

The latter moſt commonly adopted.

Many of the ſecreted fluids for very uſeful purpoſes—Others noxious and ſuperfluous.—Theſe laſt termed *excretions*.

All the ſecreted fluids may be referred to four diviſions.

1ſt. Thoſe which are intended to diſcharge from the blood ſuperfluous and noxious parts.—Urine, perſpiration, &c.

2dly. Thoſe which, after performing an uſeful purpoſe, are expelled from the body.—Bile, mucus, &c.

3dly. Thoſe which anſwer an uſeful purpoſe, after being diſcharged from the body.—Milk—Semen.

4thly. Thoſe which, after effecting a ſalutary purpoſe, are again entirely, or in a great meaſure, abſorbed and carried into the circulating maſs.—Saliva, gaſtric juice, &c.

Various hypotheſes to explain ſecretion—all unſatisfactory.—Method in which ſecretion is effected not in the leaſt underſtood.

The parts of which the more watery ſecretions conſiſt may be traced to a great degree in the blood, but the ſlighteſt veſtige of many of the ſecretions, as bile, ſemen, &c. cannot be detected.

Bile cannot be ſuperabundant in the blood veſſels, unleſs previouſly ſecreted by the liver, and afterwards conveyed into the circulating maſs.

Liver ſometimes incapable of preparing bile from the blood, in which caſe no bile to be perceived in any part of the ſyſtem.

The teſtes being removed, no ſemen diſcoverable in any other organ or part of the body.

All theſe well aſcertained, and render the explanation of the proceſs of ſecretion extremely difficult.

Various laws or phænomena of ſecretion, however well underſtood.

Secretion much affected, in many inſtances, by paſſions of the mind.—Increaſed, for the moſt part, by the *exciting paſſions*, and diminiſhed by the *depreſſing*.

Various changes in the action of veſſels in the whole body, or in particular parts, likewiſe conſiderably affect the ſecretions.

Pus, a ſecretion.—On what the opinion founded.

Some glands conſtantly ſecrete—others at certain periods of life, and at particular times—Breaſts, teſtes, &c.—Increaſed determination of blood to theſe organs on ſuch occaſions, a law of the animal œconomy.

Remarkable balance among the ſecretions.—Increaſe of one followed by the diminution of another.—Illuſtrated by urine and perſpiration, &c.

Depends upon this law, that, in many caſes of diſeaſe, a great object to promote particular ſecretions, with the view of leſſening any one that is morbidly increaſed.

Conſiderable variety in the appearance, quantity, &c. of the ſecreted fluids in different perſons, and more eſpecially at different periods of life.

Secretions affected by the mode of life, by ſleep, &c.

Moderate increaſe of action promotes ſecretion, but a violent degree of it, as in inflammation, often checks this proceſs.

Increaſe of ſecretion ſometimes the conſequence of debility and relaxation of the veſſels—At other times, great weakneſs of the whole body, induced by an increaſe of ſecretion, as happens with the milk, ſemen, &c.

On ABSORPTION.

Introductory obſervations.

Lacteals — Lymphatics — originate with open mouths or extremities.

Diſcoveries and obſervations on this ſubject, by Aſellius, Pecquet, Rudbeck, Jollyſe, Bartholine, Nuck, Ruyſch, Meckel, &c.

Lymphatics, a diſtinct ſyſtem of veſſels, that perform the office of abſorption, proved by Dr. Hunter, Dr. Monro, Mr. John Hunter, Mr. Hewſon, &c.

Lymphatic glands—the purpoſes which they ſerve not underſtood.

Lymphatic veſſels in fiſhes appear to be deſtitute of the *valvular* ſtructure, ſo remarkable in the lymphatics of the human ſubject.—This, one, among many other proofs of the irritability, or active muſcular power of theſe veſſels.

Arguments in favour of the abſorbing power of the red veins enumerated—Proved erroneous.

Numerous proofs of the function of abſorption being confined to the lymphatic ſyſtem, enumerated.

Conjectures concerning the manner of abſorption.

Capillary attraction inſufficient—Solids abſorbed in many inſtances as well as fluids—bone, &c.

Objection to Mr. Hewſon's explanation of the method in which the chyle is received into the mouths of the lacteals.

Uſes of the Abſorbent Syſtem.

1. Abſorption of the chyle, for the purpoſe of renewing the blood.

2. Abſorption of the fat or animal oil, on particular occaſions, for the purpoſe of nutrition likewiſe.

Inquiry how far probable that nouriſhment can be conveyed into the body by injections into the inteſtines, or by different fluids abſorbed from the ſkin, &c. &c.

3. Abſorption of ſome of the watery and other parts of the various ſecretions, by which they are not only rendered more fit for their intended purpoſes, but by which ſomething uſeful is reſtored to the circulating maſs. Illuſtrated by the mucus, bile, &c.

4. Abſorption of uſeleſs parts, eſpecially in the progreſs of growth. Illuſtrated by experiments with madder, &c.—Abſorption of the thymus gland, of the alveolar proceſſes of the jaw, &c.

Conſideration of various ſalutary proceſſes, depending upon abſorption.

Phænomena of exfoliation, removal of dead and mortified parts from the living, diſcharge of pus from abſceſſes, of various extraneous bodies, &c. all on the ſame principle.

Advantages ariſing from a knowledge of the courſe of the lymphatic veſſels.

Abſorbent veſſels remarkably more active in ſome inſtances than others.—Difficult to determine upon what this difference depends.—Abſorption increaſed in ſome caſes of weakneſs—In others diminiſhed.

Inflammation, how far favourable to abſorption.

Remarkable inſtances of great quantities of fluid ſuddenly removed from different cavities.

Abſorption of urine from the bladder ſometimes extremely quick.

Abſorption by the ſurface of the body, and by the lacteals in diabetes uncommonly great.

Singular caſe of increaſed abſorption related.

Another from Dr. Watſon's Chemical Eſſays.

Theſe various phænomena prove the active muſcular power of the abſorbent ſyſtem before mentioned.

Caſes in which abſorption is more particularly *diminiſhed*.

Examination of Mr. Darwin's opinion of the retrograde motion of the abſorbent ſyſtem.—Various facts, ſuppoſed to depend upon this principle, better underſtood by an attention to the immediate communication which ſome of the abſorbents appear to have with the blood veſſels, independent of the thoracic duct, &c.

Properties of the SECRETED FLUIDS.

General obſervations.

1ſt. Of Perſpiration.—Senſible—inſenſible.—Source the ſame.

Properties of the ſenſible perſpiration or ſweat varied by the mixture with the *ſebaceous* matter of the ſkin.

Inquiry whether the perſpiration be derived from ſmall glands, or from the extremities of the exhalent arteries.

Exhalation from the lungs, in what view to be conſidered.

Perſpiration, of what compoſed.

Accidental impregnations from particular articles of diet, &c.

Quantity of the perſpirable matter very great, but much varied by climate, diet, age, ſex, temperament, &c.

Examination of its quantity attempted by ſtatical experiments, by Sanctorius, &c.

Keil's Calculation in Britain, Bryan Robinſon's, in Ireland, and Lining's, in South Carolina.

Quantity of perſpiration depends much upon the proportion of ſuperfluous water in the blood, determined to the ſurface of the body, by heat and exerciſe.

Conſideration of ſome of the phænomena attending increaſed perſpiration, and of the cauſes producing it.

Cauſes producing a diminution of perſpiration.

Concluſion.

2dly. Urine.

Obſervations on its ſecretion, expulſion, &c.

Its analogy to the perſpiration.

Compoſed principally of water and ſaline matter.

Greater proportion and variety of the latter than in the perſpiration.

Much affected by age, paſſions of the mind, and by different ingeſta.

Sediment or cloud obſervable in urine, conſidered. —Compoſed of mucus and earth in different proportions, according as it is more thick and ropy, or in form of a powder, &c.

Examination of the various ſaline impregnations in urine—Microcoſmic ſalt, ſelenite, phoſphorated lime, &c.

Attempt to determine the mean quantity of urine in twenty-four hours.

Greateſt quantity in diſeaſe.

Obſervations upon the connexion or balance kept up between the urine and perſpiration, with the effects of heat and cold upon theſe ſecretions.

Varieties in the urine, extremely great on different occaſions.

Saccharine impregnation in diabetes, conſidered.

Inquiry whether the various appearances exhibited by the urine can be conſidered a ſatisfactory indication of the ſtate of diſeaſe.

Obſervations upon urinary calculi.

PROPERTIES of MUCUS.

PROPERTIES of the SALIVA and PANCREATIC JUICE.

Of the BILE.

Hepatic and cyſtic bile.

Examination of the experiments and opinions of Dr. Maclurg, on this ſubject.

Contains a coagulable part, ſimilar to the coagulable lymph of the blood.

Preſence of phlogiſton—How proved?

Erroneous ideas of Boerhaave and others, with regard to its ſaponaceous property.

Chief uſe of the bile—as a ſtimulus to keep up the periſtaltic motion of the inteſtines.

Ideas of its correcting acidity, and being corrected in turn by acids, examined.

Antiſeptic property of bile.

Phænomena of increaſed ſecretion of bile in warm climates, to what cauſe moſt probably to be attributed.

Effects produced by various paſſions of the mind, upon this ſecretion.

Gall ſtones—their properties, &c.

Manner in which the bile is received into the blood, after its ſcretion, in caſes of jaundice, &c.—Proved to be by abſorption, and not by regurgitation.

Of the MILK.

Food or nouriſhment of the new born animal, in the claſs of *mammalia*.

Spontaneous ſeparation—Cream—Skimmed milk.

Further diviſion into oil or butter, coagulable, or cheeſy part, and ſerum.

Theſe preſent, tho' in different proportions in the milk of all animals.

Sugar of milk conſidered.

Coagulation of milk, produced by ſo great a variety of ſubſtances, that the principle on which they act, not underſtood.—Experiments by Dr. Young, related.

Suppoſed analogy between blood and milk, examined.

Properties of milk much affected by different kinds of food, &c.

Paſſions of the mind produce a conſiderable alteration in its qualities.

Phænomena connected with the continuance of the ſecretion.

Stimulus of friction.

Milk, like all other ſecretions, furniſhed by the blood, and in no degree by unaſſimilated chyle.

NERVOUS

NERVOUS SYSTEM.

General Obſervations.

Different parts of which the nervous ſyſtem may be ſaid to conſiſt.

Term of vital or living ſolids, how far applicable to the nerves and muſcles.

Obſervations upon the mutual communication or influence between the mind and body, through the medium of the nerves. The connection, however, not ſo very intimate that they invariably affect each other in turn.

Mind ſometimes much diſordered, without any evident correſponding corporeal affection.

Body conſiderably altered in ſome caſes, and almoſt conſumed by diſeaſe, the operations of the mind being at the ſame time preſerved nearly intire.

Nerves, by their communication with the brain, or ſenſorium, proved to be the inſtruments of ſenſation.

Continuation of nerves from the brain into the muſcles, how far the cauſe of motion.

Senſibility, or the faculty by which ſenſe or ſenſation is produced, a more general function than that of motion, being preſent wherever there are nerves communicating with the brain, while motion depends upon the preſence of muſcles, or muſcular fibres.

Experiments and Obſervations of Haller, upon Ligaments, Tendons, &c. in which nerves cannot be diſtinctly traced, to ſhew their inſenſibility.

The opinion proved erroneous by Dr. Whytt.

Examination of the various hypotheſes which have been formed to explain the functions of the brain and nerves.

Suggeſtion or query of Sir Iſaac Newton, upon this ſubject.

Doctrine of tremor, or vibration.

View in which the vibration is conſidered, more eſpecially by Dr. Hartley.

Suppoſed exiſtence of a nervous fluid, and of the tubular ſtructure of the nerves.

Doctrine, which refers the nervous energy to Electricity or ſomething analagous to the electric fluid, examined.

All the hypotheſes unſatisfactory, and the manner in which the nerves produce their effects, not in the leaſt underſtood.

Senſation very different in different parts of the body, ſeemingly connected with the ſize and number of the nerves, as well as with a numerous diſtribution of blood veſſels.

In all the organs of ſenſe, and in parts endowed with acute ſenſation, nerves and blood veſſels extremely numerous.

Uſes of ſenſation.

Some parts of the body capable only of the ſenſation of pain—others of various ſenſations, &c.

Parts capable of a variety of ſenſations, diſtinguiſhed more particularly by the title of *organs of ſenſe*.

Obſervations upon the ſenſe of touch, taſte, ſmelling, hearing, and ſeeing.

Theſe ſubjects too extenſive to be fully and ſeparately examined—Such obſervations to be ſelected, therefore, as are applicable to all of them, or to ſenſation in general.

Many of the laws relating to ſenſation very important, and well aſcertained.

A certain force or ſtrength of impreſſion on the organ, or feeling part, neceſſary to ſenſation.

Different effects of impreſſions, from the ſlighteſt to the moſt violent, illuſtrated.

Senſations, for the moſt part, ſtronger or weaker, only as being ſtronger or weaker than thoſe which immediately preceded them, or, than the degree of force to which the nerves had been previouſly accuſtomed—illuſtrated.

A certain duration of impreſſion, neceſſary to diſtinct ſenſation.—Large bodies may be moved with ſuch velocity as not to be diſtinctly ſeen, &c.

A proper degree of attention, or the mind's reſting ſome time upon one ſenſation, is required to give an impreſſion its full effect; for the mind being occupied on other objects, a pretty ſtrong impulſe may be made on the organs of ſenſe, without being clearly perceived.

Great acuteneſs and perfection of the different ſenſes, how produced.

Utility derived from the ſeparate and moderate exerciſe of the different ſenſes, with illuſtrations, and various phænomena connected with the perfection of the ſenſe of touch, &c.

When the force and duration of impreſſion, and the attention of the mind, all contribute properly to the effect, the ſenſation often remains ſome time after the impreſſion or action of the external body has ceaſed.

Additional obſervations upon the laws of ſenſation.

Senſation may be increaſed, diminiſhed, or intirely loſt.

An increaſe of ſenſation may be produced by a greater ſtimulus, or more violent impreſſion than the nerves have been accuſtomed to; or, ſuppoſing the ſtimulus moderate and of the ordinary kind, the ſame effect may ariſe from an increaſe of ſenſibility.

Morbid ſenſations are to be diminiſhed therefore, either by diminiſhing the ſtimulus, or by leſſening the ſenſibility.

In ſome caſes, both may be accompliſhed at the ſame time, with advantage.

Increaſed ſenſibility, how far connected with weakneſs.

Pain, or a morbid increaſe of ſenſation, is not always accurately referred by the mind, to the exact ſeat of it, eſpecially in deep ſeated or internal diſorders.

Effects of pain in different degrees upon the conſtitution.

Beſt method of judging of the degree of pain in particular inſtances.

Phænomena connected with a diminution, or intire loſs of ſenſation.

Of *Motion.*

Mobility, motion, or action, a property of muſcles, or muſcular fibres, depending upon their contraction, in conſequence of the operation of different ſtimuli.

This diſpoſition to contraction in muſcular fibres, termed their irritability, and in proportion as they are more readily excited to contract, they are ſaid to be more irritable.

Different appearance of muſcular fibres in different animals, and in different parts of the ſame animal.

Contraction of muſcular fibres very different from elaſticity.

Muſcular fibres a diſtinct and peculiar ſtructure, and not the moving extremities of nerves, as once thought; the nerves being only diſtributed to them, ſometimes appearing to end in their ſubſtance, at other times paſſing through them to other parts.

Various hypotheſes to explain the manner in which muſcular motion is performed, unſatisfactory, and the ſubject very obſcure, and by no means underſtood.

Examination of the queſtion, whether all motion in muſcles is derived from the nerves, or whether, independent of the nerves, they poſſeſs a *vis inſita*, or power of contraction.

Various arguments employed by Haller, Whytt, Monro, &c. on this ſubject.

Phænomena of muſcular contraction—tremor, ſhortening, increaſed thickneſs, hardneſs, rough or wrinkled ſurface, &c.

Phænomena of relaxation in muſcular fibres, as neceſſarily alternated with contraction.

Tendons—their uſe, &c.

Force with which muſcles act extremely great—illuſtrated by the exertions of labouring perſons, maniacs, and others.

Velocity of muſcular contraction illuſtrated.

Facility with which muſcular fibres can be excited to contraction, and the force with which it is performed, extremely different.

Stimuli defined.—Stimulant and ſedative powers, obſervations upon.

Tone—what? And how far connected with tenſion or diſtention.

Muſcular action, either voluntary, involuntary, or mixed.

Effects of exerciſe upon the voluntary muſcles.

Paſſions of the mind—their influence upon the muſcles.

Conſideration of various phænomena of muſcular action, as connected with the principle of imitation.

Hyſterical and other convulſive diſorders—animal magnetiſm, &c.

Motion may be increaſed, diminiſhed, or entirely loſt.

A morbid increaſe of motion may be produced, either by the unaccuſtomed or exceſſive application of ſtimuli; or, ſuppoſing the ſtimulus of the ordinary and moderate kind, by an increaſe of mobility, or a greater diſpoſition than uſual in the muſcular fibre to be acted upon.

Mobility, or an increaſed tendency to motion, often connected with weakneſs, tho' ſometimes quite independent of each other.

Exceſs of mobility ſometimes hereditary, but often acquired by the mode of life, &c.

Inquiry whether ſenſibility and mobility, or irritability are always in proportion to each other, or more ſtrictly, whether irritability in muſcular fibres always implies ſenſibility.

View of the controverſy between Haller and Dr. Whytt, on this ſubject.

Torpor, or diminiſhed mobility,—obſervations upon.

Different nerves for ſenſation and motion—On what the idea founded.—Hypotheſis to be rejected.

General obſervations upon ſpaſm, convulſion, &c.

Subject of *ſympathy*, as connected both with ſenſation and motion, conſidered.

Sympathy, in a medical ſenſe, how defined.

Various illuſtrations of ſympathy, both in the healthy and diſeaſed ſtate of the body.

Sympathy, how far underſtood by an attention to the diſtribution of the nerves, the ganglions of the nerves, &c.

Effects of *habit* or *cuſtom* upon ſenſation and motion.

Various phænomena of importance in the action of medicines, connected with habit.

Many diſeaſes, eſpecially of the convulſive kind, continued by habit.

Independent of the medical treatment neceſſary in the interval of convulſive paroxyſms, a great object to break the force of the paroxyſm itſelf, by antiſpaſmodic remedies, and other means, ſo as to prevent their continuance, on the principle of habit.

Internal ſenſes conſidered.

Memory, imagination, and judgment—Remarks on each.

Healthy condition of the brain, how far neceſſary to the proper exerciſe of the intellectual faculties.

General obſervations upon the diſordered ſtate of the mind, as connected with mania and phrenitis, but more eſpecially with the different ſtates of delirium, occurring in fever.

PASSIONS of the MIND.

General obſervations.

The paſſions, when moderate, ſtrictly natural, conſtant in their operation, and by the numerous modifications which they admit, ſtrongly characterize the human ſpecies.

Inveſtigation of the effects produced by them, an object of great importance in the ſtudy of medicine.

Many diſeaſes, or ſymptoms of diſeaſe, only to be alleviated or removed by the proper regulation of the paſſions.

Sometimes, even proper to excite particular paſſions of the mind, with a view to the removal of diſeaſe.

Various diviſions of this ſubject by different authors.

Difficult to fix upon a diviſion that may prove unexceptionable.

Examination of the emotions of *Joy*, *Deſire*, *Hope*, *Grief*, *Terror*, *Fear*, *Anger*, and their varieties.

Love, in what view to be conſidered.

Uſeful diviſion of the paſſions, into *exciting* and *depreſſing*.

Effects of the paſſions upon the countenance or muſcles of the face.

Phyſiognomy, how far founded in nature.

Paſſions ſeparately conſidered.

Of *Joy*.

Its effects, when moderate, as conducive to health and long life, by promoting appetite and digeſtion, circulation, ſecretion, &c.

When exceſſive, great inconvenience from it—Hyſteria, epilepſy, mania, and even death, of which hiſtory furniſhes ſeveral remarkable inſtances.

Under what circumſtances proper to excite joy, for the removal of diſeaſe.

Of *Deſire*, one of the moſt ſtriking examples of which is love.

Increaſed energy of the brain and nerves, &c.

The effects irregular and much varied, the excitement of deſire being often alternated with grief, anxiety, &c.

Catalepſy, as produced by love, in what view to be conſidered.

Of *Hope*—Its operation almoſt conſtant and productive of very ſalutary effects—Great object in many acute as well as chronic diſeaſes, to impreſs the patient with the hope of a recovery.

Of *Anger*—Its pernicious effects—Circulation quickened—Diſtention of the veſſels of the brain, head-ach, hæmorrhage, epilepſy, apoplexy, &c.

Of *Terror*—Irregular and violent motions in the body — Rapidity of circulation — Hæmorrhage, abortion, &c.

Of the depreſſing effects of *Grief* and *Fear*, with the circumſtances of agreement and difference.

Of SLEEP.

The body invigorated under the ſuſpenſion of ſenſation and voluntary motion, which conſtitutes ſleep.

Phænomena of ſleep—Effects upon the pulſe, reſpiration, heat, and ſecretions.

Continuance of ſleep, as affected by age, temperament, cuſtom, &c.

Interrupted by various external and internal ſtimuli—Light, noiſe, agitation of the body—Hunger, thirſt—Stimulus of the urine and fæces.

Exact condition of the brain during ſleep, or the proximate cauſe of it not underſtood.—Various hypotheſes founded on the compreſſion of the blood veſſels of the brain, not admiſſible.

Remote cauſes of ſleep however, or the various circumſtances which favour it, well aſcertained, and ſhould be kept in view in the treatment of diſeaſes.

Inconveniencies ariſing from want of ſleep.

Inconveniencies from exceſs of ſleep.

Dreams, how far underſtood.

Of TEMPERAMENT.

In what ſenſe the term to be underſtood.

Study of temperament, or variety of conſtitution, ſtrongly recommended, with an attempt to remove the difficulties uſually attendant upon the inveſtigation of this ſubject.

Deſcription of temperaments by the Ancients, and particularly by Galen, in ſome reſpects accurate, but explained upon the erroneous principle of different conditions of the fluids.

Doctrine of the Chemiſts.

Temperaments divided into *athletic*, *phlegmatic*, *melancholic*, and *irritable*.

Marks of the *athletic* temperament, with the diſeaſes moſt likely to occur in it.

Phlegmatic temperament—the reverſe of the laſt—Relaxation, flaccidity; torpor, both of body and mind, &c.

In what manner induced or aggravated—Diſeaſes moſt likely to occur in it—Principle on which they are to be obviated.

Melancholic temperament.

State of the mind, ſkin, eyes, hair—Languid circulation, torpor of the alimentary canal.

Diſeaſes moſt frequent in this temperament, and how beſt corrected.

Irritable temperament—extremely frequent—ſlender limbs and muſcles, fair ſkin, light coloured hair—quickneſs of action, without ſtrength, both mind and body being ſuſceptible of conſiderable changes from the ſlighteſt impreſſions—often hereditary, though ſometimes acquired, or at leaſt much aggravated by the mode of life.—Numerous train of diſeaſes likely to occur in it.—Principle on which they are to be alleviated or removed.

Inquiry how far the temperament called *choleric*, is only a variety of the laſt, or whether it ſhould be conſidered as a diſtinct temperament.

Additional remarks upon this ſubject.

Temperament—to what extent affected by the changes which take place at different periods of life.—How far affected by climate, mode of life, &c. or by the operation both of *phyſical* and *moral* cauſes.

Of NUTRITION, and the CHANGES DURING GROWTH, &c.

Nutrition effected by the coagulable lymph of the blood, but the manner in which it produces the effect extremely obſcure.

Speculations on this ſubject, by Haller and other Phyſiologiſts.

Remarkable change about the 35th or 40th year, conſidered.

Venous plethora, venous hæmorrhage, &c.—Explanation of Sir Clifton Wintringham.

Principle on which the changes may be more ſatisfactorily underſtood.

Phænomena of old age.

Natural death, from the gradual diminution of the powers both of the mind and body.

PUBERTY.

Increaſed excitement and ſtrength at this period.

Increaſed determination of blood to the organs of generation, &c.

Changes in the *male*.

Alteration of voice—Intellectual faculties enlarged—Firſt approaches of particular paſſions—Removal of certain diſeaſes before troubleſome and unmanageable.

Effects of *caſtration*.

Fierce animals rendered tame, and various other changes produced by this operation, Phænomena of puberty in the male moſt commonly aſcribed to the abſorption of the ſemen.

Various arguments to prove that this opinion is erroneous.

Changes at puberty to be aſcribed to a law of the ſyſtem, by which an increaſe of action and excitement is produced, the ſecretion of the ſemen being an effect of the general excitement, &c.

Changes in the *female*, at the period of puberty, equally important with thoſe of the male.

Syſtem invigorated, and various obſtinate diſorders ſometimes removed—Enlargement of the mammæ—Sudden and remarkable growth of the whole body in ſome inſtances—Catamenia, or menſtrual diſcharge—Fitneſs for conception.

Firſt appearance of the catamenia—Serous whitiſh fluid, gradually becoming reddiſh, or bearing a reſemblance to blood, but ſo much diluted with ſerum that it does not readily coagulate.

Inquiry whether coagulation has ever been obſerved in the menſtrual diſcharge.

Symptoms or phænomena in the ſyſtem, during the firſt flow of the menſes.

Varieties in the age at which the diſcharge begins and ceaſes, according to climate, and various other circumſtances.

Conception connected with the continuance of the menſes.

No ſatisfactory inſtances, in which this proceſs has been carried on, after the *complete* ceſſation of the catamenia.

Great variety in the quantity diſcharged, and in the duration in different women, compatible with health.

Varieties in the period of return, &c. conſidered.

Ceſſation during pregnancy, and the period of giving ſuck.

Inquiry whether the diſcharge be from the uterus or vagina.

Proved to be chiefly from the uterus, tho' occaſionally from the vagina likewiſe.

Difficulties attending the inveſtigation of the purpoſes anſwered by the menſes.

Inquiry whether any thing ſimilar obtains in other animals, and to what extent.

Conjecture of Marrher, and other Phyſiologiſts, on this ſubject.

Various hypotheſes to account for the production of the catamenia, enumerated.

Arguments commonly employed in favour of the doctrine of *general plethora*, as connected with the diſcharge.

Arguments in favour of *partial plethora.*

All theſe proved erroneous.—The ſubject not ſatisfactorily underſtood, and can only be referred to a law of the animal œconomy.

Varieties in the menſtrual diſcharge, either as the conſequence or the cauſe of diſeaſe, conſidered.

Obſervations upon the action of *emmenagogue* remedies.

GENERATION.

View of the opinions entertained on this ſubject by Hippocrates and others among the Ancients.

Experiments and obſervations of Harvey.

De Graaf, the diſcoverer of ſome of the beſt aſcertained phænomena on generation.

Rudiments of the fœtus in the ovaria of the female.—Fallopian tubes poſſeſs a power of adapting themſelves occaſionally to the ovaria, ſo as cloſely to embrace them.—Paſſage of the *ovula* through the Fallopian tubes into the uterus, &c.

Microſcopical obſervations of Leuwenhoeck, with regard to the preſence of animalculæ in the male ſemen.

Hypotheſis of Buffon, on the ſubject of generation.

Review of the principal opinions on generation, with the arguments in favour of each.

1ſt. Of that which aſſigns the production of the fœtus equally to male and female.

2dly. That which refers it principally to the male. And,

3dly. Of that, which aſſigns it chiefly to the female.

The laſt ſupported by a greater number of facts than the others, though not without its difficulties.

Diſcoveries of Malpighi, Haller, and Spallanzani, in favour of it.

Short view of the Experiments and Concluſions of Spallanzani.

Review of the phænomena that appear to have been well aſcertained, on the ſubject of generation, with an attempt to diſtinguiſh them from thoſe which are only conjectural, or not yet ſatisfactorily aſcertained.

1. The preſence and healthy condition of the ovaria, eſſential to conception.

2. Peculiar diſcolouration, rupture, and change in the ovaria, always correſponding to the number of fœtuſes.

3. Occaſional preſence and conſiderable growth of the fœtus in one of the ovaria, as a proof that the rudiment of the fœtus is originally there.

4. Paſſage of the rudiment of the fœtus from the ovarium through the fallopian tube into the uterus, proved by the occaſional preſence and growth of the fœtus in that tube.

5. The ſemen from the male does ſometimes penetrate the cavity of the uterus, as proved by Ruyſch, &c.

Subject of conjecture, 1ſt. Whether any of the particles of the male ſemen enter into the formation of the fœtus, or whether it only operates as a ſtimulus capable of rouſing the rudiment of the fœtus into a ſtate of active exiſtence. And,

2dly, If the male ſemen only produces the effect by its peculiar ſtimulant quality, to what part or parts ſhould the ſtimulus be neceſſarily applied, for the purpoſes of conception.

Is its action upon the vagina and os tincæ ſufficient, or ſhould it be received into the uterus?

Is it neceſſary that it ſhould be conveyed along the fallopian tube to the ovarium, and ſuppoſing it to be depoſited there, is it received into its ſubſtance by abſorption, or in what other way may it be ſuppoſed to operate?

THE END.